SYNTHETIC ENVIRONMENTAL INDICATOR

The 2008 Environmental Survey of Families (hereinafter EMAF), whose results were published in 2008, is a complete and comprehensive information repository, given its sample volume and the diversity of the topics considered with its more than 380 variables.

Eustat believed it to be appropriate to construct a composite or synthetic indicator that positions the households and individuals of the Basque Country (CAE) according to their degree of environmental awareness, impact and habits, based on the information available in the EMAF. Therefore, Eustat was part of the work group made up of representatives of the Spanish National Statistics Institute, Andalusian Statistics Office, Catalan Statistics Office and the Galician Statistics Office. A common methodology was established to be used by the different statistics institutes and offices, which would thus enable the results to be compared between the Autonomous Communities. This comparison will not be able to be performed until the results are available from the other Autonomous Communities, as this document only describes the unified methodology applied in the Composite Environmental Indicator, without describing the methodology to be used during the results comparison phase.

DEFINING THE THEORETICAL FRAMEWORK AND SELECTING VARIABLES

The **conceptual objective** of the Synthetic Environmental Indicator is to position the households and individuals of the Basque Country according to their degree of awareness of environmental problems, taking into account their group and individual behaviour. It involves combining information on the habits of the households and individuals that have an environmental impact, along with their degree of social awareness, into a single indicator

A set of teams of independent experts[1] on environmental issues have stressed the following seven **dimensions** or core areas as being particularly important when measuring the environmental phenomenon:

1. Water Saving
2. Energy Saving
3. Disposal of regular waste
4. Disposal of sporadic waste
5. Consumption guidelines
6. Transport and mobility
7. Environmental attitude

On the one hand, it is recommended to analyse the environmental impact of households as the result of their habits and behaviour either from their own choice, or induced by their socio-economic characteristics[2]. On the other hand, dimensions or core areas are also included that consider the social and economic environmental awareness of the individuals.

In order **to identify simple indicators** within each core area or dimensions, the independent experts made their choice from among those questions on the EMAF questionnaire aimed at the whole sample.

The Water Saving dimension is not aimed at directly measuring the overall consumption of water of the households, but rather their saving habits and, therefore, the awareness level of the effects of wasting water. 9 simple indicators were selected.

1. WATER SAVING
1.1. Uses a lever mixer or thermostatic tap
1.2. Uses water saving appliances
1.3. Uses flow restrictors
1.4. Recycles water

[1] Consulted by Eustat and by the other statistics office of the Environmental Synthetic Indicator working group.
[2] With regard to "Consumption Guidelines" and "Transport and Mobility", the impact, for example, that the family budget may have on the decisions adopted by the households irrespective of their environmental awareness. The effect of the institutional backing may also be crucial in some aspects.

1.5. Fills the sink before washing dishes
1.6. Fills the dishwasher and washing machine before using them
1.7. Closes the water stopcock to reduce the flow
1.8. Closes the tap when washing teeth or lathering with soap
1.9. Showers instead of baths

Two types of simple indicators can be seen in the Energy Saving dimension. On the one hand, indicators related to the habits of the household are included and, on the other hand, indicators that assess the amenities of the housing, which, in the majority of cases, are related to investments by the families aimed at reducing the energy impact of their homes.

2. ENERGY SAVING
2.1. Has solar energy in the house
2.2. Turns the heating off at night
2.3. Daytime temperature degrees with heating on
2.4. Daytime temperature degrees with air-conditioning on.
2.5. Turns off the air-conditioning at night.
2.6. Has windows with canopies
2.7. Has windows with blinds and shutters
2.8. Has windows with tinted glass or sun protectors
2.9. Has double-glazed windows:
2.10. Has windows with thermal bridge break
2.11. Has fluorescent tubes or lights
2.12. Has low-consumption light bulbs
2.13. Rooms with fluorescent or low-consumption light bulbs
2.14. Energy rating of the fridge
2.15. Energy rating of the washing machine
2.16. Energy rating of the drier
2.17. Energy rating of the dishwasher
2.18. Energy rating of the oven
2.19. Uses the half-load/economy programme on the washing machine
2.20. Uses the half-load/economy programme on the separate drier
2.21. Uses the half-load/economy programme on the dishwasher
2.22. Programs the water temperature for the washing machine
2.23. Use the “stand-by" option when switching of the electrical appliances

With regard to the waste disposal elections, 4 simple indicators were selected for regular waste and 13 for sporadic waste that reflect the habits of the household that influence their environmental impact. The authorities can also have a significant impact on these dimensions (infrastructure aimed at facilitating waste disposal).

3. DISPOSAL OF REGULAR WASTE
3.1. Separates organic waste:
3.2. Separates paper and cardboard
3.3. Separates glass
3.4. Separates packaging/plastics

4. DISPOSAL OF SPORADIC WASTE
4.1. Disposes of vehicle tyres
4.2. Disposes of motor oil
4.3. Disposes of vehicle batteries
4.4. Disposes of chemical products
4.5. Disposes of medicines
4.6. Disposes of small batteries
4.7. Disposes of mobile telephones
4.8. Disposes of household appliances
4.9. Disposes of furniture or other household appliances
4.10. Disposes of rubble or building waste

4.11. Disposes of cooking oil
4.12. Disposes of fluorescent tubes
4.13. Disposes of textiles and footwear

The Consumption Guidelines core area includes indicators to quantify the final reflection of environmental awareness in consumption habits. There are factors that can affect consumption habits, as well as environmental awareness, such as the purchasing power of the families and institutional support (mainly by means of subsidies and grants) to foster the use of environmental products.

5. CONSUMPTION GUIDELINES
5.1. Uses disposable products
5.2. Uses recycled paper
5.3. Uses returnable packaging
5.4. Uses rechargeable batteries.
5.5. Takes energy efficiency and consumption into account
5.6. Takes ecological guarantee or label into account
5.7. Takes local product and production proximity into account

The Transport and Mobility dimension, which is also related with individuals' habits (personal choice or not), includes some fundamentally important aspects to measure the everyday impact of individuals on the environment. External factors to the households and individuals, such as institutional support for mass transit, etc., also significantly affected this dimension.

6. TRANSPORT AND MOBILITY
6.1. Persons who use public transport, cycle or walk, or do not travel (%)
6.2. Persons who use private transport (%)
6.3. Type of vehicle 1
6.4. Vehicle air conditioning
6.5. Fuel used in vehicle 1
6.6. Usual means of transport
6.7. On foot for distances under 2 kilometres

Finally, the Environmental Attitude core area seeks to measure the level of active involvement of the individuals in different environmental conservation activities. A total of 13 simple indicators were selected.

7. ENVIRONMENTAL ATTITUDE
7.1. Is concerned about the environment
7.2. Works with an organisation to defend the environment
7.3. Takes part in environmental volunteer actions
7.4. Signs petitions against environmentally-hazardous situations
7.5. Demonstrates against any environmentally hazardous situation
7.6. Personally denounces environmental problems
7.7. Is in favour of fining people to ensure waste separation
7.8. Is in favour of restricting abusive water consumption
7.9. Is in favour of establishing a tax on the most polluting fuels
7.10. Is in favour of restricting the use of private transport
7.11. Is in favour of establishing an ecological tax on tourism
7.12. Is in favour of installing a renewable energy park
7.13. Is in favour of paying more for using alternative energies

The resulting indicator is a composite indicator that is hierarchically composed of 76 simple indicators grouped into 7 core areas or dimensions, reflecting the multi-dimensionality of the phenomenon in question.

DATA AVAILABILITY AND PROCESSING

Once the composite indicator had been designed, the data was collected. In this case, and given that the sole and exclusive source of information is the EMAF, the information was gathered immediately and it was not necessary to carry out any missing **data imputation**, as this exercise was carried out during the exploitation phase of the EMAF itself.

The complete data matrix was used to perform a **multivariate analysis** in order to:

- establish the relevance of the selected simple indicators when quantifying the degree of environmental awareness.
- identify, in turn, those dimensions of greater relevance in terms of environmental awareness.

First of all, a correlation analysis was performed for the set of initially selected simple variables or indicators. The main conclusions can be summarised as:

1. The “Separates paper and cardboard”, “Separates glass” and “Separates packaging/plastics” indicators of the “Regular waste” dimension show a high correlation, close to 0.8. There is therefore a significant positive correlation between recycling paper and recycling glass and plastic packaging. It should be pointed that these are three basic environmental habits with a high degree of penetration among the population of the Basque Country.

2. The “Disposes of vehicle tyres", "Disposes of engine oil" and "Disposes of vehicle batteries" indicators, belonging to the "Sporadic waste" dimension, also show a high correlation, over 0.7. In this case, it seems that the main reason for the correlation is that the recycling of the identified products (all of which come from the vehicle) in the three cases require prior knowledge for their removal/replacement/renewal.

The other variables are not significantly correlated for the EMAF. The information obtained using the correlation analysis is of vital importance for the allocation of weights or weighting to each of the simple and composite indicators associated to each of the dimensions that make up the general composite indicate that is described below.

Once the correlation matrix of the variables was obtained, a Factorial Analysis was performed. The objectives of this document do not include breaking down the results obtained. It should be merely pointed out that factors are not obtained for the used data matrix that explain the variability of the data significantly. In fact, in order to explain 50% of the total variance, 20 factors need to be considered and up to 44 factors are required to explain 80% of the total variance.

Given the results obtained, the multi-dimensionality is obvious of the environmental awareness concept that is being analysed. The degree of awareness of a household and individual is determined by a wide set of behaviours, habits, attitudes and, even, convictions. They also have their applications in different spheres and situations, such as water consumption, energy, transport, etc. There are no significant correlations between the different environmental behaviour and neither has a reduced number of factors be detected that allow, with guarantees regarding the explained variance, to reduce the dimensionality of the phenomenon. This provides statistical backing to the high number of simple indicators and dimensions related to the composite indicator.

Once the data matrix was analysed and before proceeding to aggregate simple indicators, **data mainstreaming** needed to be performed, given that the simple indicators present different measurement units. The different groups of environmental experts consulted have recommended penalising determined responses associated to behaviours, attitudes and habits that are not environmentally friendly. This allows greater nuances to be introduced (for example, some answers neutralising others) and enhances the final results, as the environmental awareness levels would be measured by a more demanding level.

The mainstreaming criteria proposed by the panel of experts are broken down in the following table, where each indicator is identified by the number of question in the EMAF questionnaire.

Question	Value	Simple indicator	Points
WATER SAVING			
P18.1	1	Uses a lever mixer or thermostatic tap: YES	1
	6	Uses a lever mixer or thermostatic tap: NO	0
P18.2	1	Uses water saving appliances: YES	1
	6	Uses water saving appliances: NO	0
P18.3	1	Uses flow restrictors: YES	1
	6	Uses flow restrictors: NO	0
P19.1	1	Recycles water: YES	1
	6	Recycles water: NO	-1
P19.4	1	Fills the sink before washing dishes: YES	1
	6	Fills the sink before washing dishes: NO	-1
P19.5	1	Fills the dishwasher and washing machine before using them: YES	1
	6	Fills the dishwasher and washing machine before using them: NO	-1
P19.6	1	Closes the water stopcock to reduce the flow: YES	1
	6	Closes the water stopcock to reduce the flow: NO	-1
P75.1	1	Closes the tap when washing teeth or lathering with soap: YES	1
	6	Closes the tap when washing teeth or lathering with soap: NO	-1
P75.2	1	Showers instead of baths: YES	1
	6	Showers instead of baths: NO	-1
ENERGY SAVING			
P22	1	Has solar energy in the house: YES	1
	6	Has solar energy in the house: NO	0
P32	1	Turns the heating off at night: YES	1
	2	Turns the heating off at night: Yes, turned off from the control unit	1
	6	Turns the heating off at night: NO	-1
	-	The house does not have heating	0.5
P34	<=20	Up to 20º daytime temperature	1
	21	Up to 21º daytime temperature	0
	>=22	Over 22º daytime temperature	-1
	-	The house does not have heating with thermostat	0
P41	1	Turns off the air-conditioning at night. YES	1
	2	Turns off the air-conditioning at night. Yes, turned off from the control unit	1
	6	Turns off the air-conditioning at night. NO	-1
	-	The house does not have air-conditioning	0.5
P40	<=21	Up to 21º daytime temperature	-1
	22-23	Up to 22º-23º daytime temperature	0
	>=24	Over 24º daytime temperature	1
	-	The house does not have air-conditioning	0
P43A.1	1	House has windows with canopies: YES	1
	6	House has windows with canopies: NO	0
P43B.1	1	House has windows with blinds and shutters: YES	1
	6	House has windows with blinds and shutters: NO	0
P43C.1	1	House has windows with tinted glass or sun protectors: YES	1
	6	House has windows with tinted glass or sun protectors: NO	0
P43D.1	1	House has double-glazed windows: YES	1
	6	House has double-glazed windows: NO	0
P43E.1	1	House has windows with thermal bridge break: YES	1
	6	House has windows with thermal bridge break: NO	0
P44	1	Has fluorescent tubes or lights: YES	1
	6	Has fluorescent tubes or lights: NO	0
P45	1	Has low-consumption light bulbs: YES	1
	6	Has low-consumption light bulbs: NO	-1
P47	1	Fluorescent or low-consumption light bulbs: In all rooms	1
	2	Fluorescent or low-consumption light bulbs: In the majority of rooms	0.5
	3	Fluorescent or low-consumption light bulbs: In some rooms	0.25
	-	House does not have fluorescent or low-consumption light bulbs	0
P53A.3	1	Has a fridge with A, A+, A++ energy rating: YES	1
	6.9	Has a fridge with A, A+, A++ energy rating: NO, NK/NA	0
	-	The household does not have a fridge	0
P53B.3	1	Has a washing machine with A, A+, A++ energy rating: YES	1
	6.9	Has a washing machine with A, A+, A++ energy rating: NO, NK/NA	0
	-	The household does not have a washing machine	0
P53C.3	1	Has a drier with A, A+, A++ energy rating: YES	1
	6.9	Has a drier with A, A+, A++ energy rating: NO, NK/NA	0
	-	The household does not have a drier	0.5
P53D.3	1	Has a dish washer with A, A+, A++ energy rating: YES	1
	6.9	Has a dish washer with A, A+, A++ energy rating: NO, NK/NA	0
	-	The household does not have a dish washer	0

P53E.3	1	Has an oven with A, A+, A++ energy rating: YES	1
	6.9	Has an oven with A, A+, A++ energy rating: NO, NK/NA	0
	-	The household does not have an oven	0
P53B.5	1	Has a washing machine with half-load/economy programme: Yes, but they do not use it	-1
	2	Has a washing machine with half-load/economy programme: Yes, and they use it	1
	3	Has a washing machine with half-load/economy programme: NO	0
	-	The household does not have a washing machine	0
P53C.5	1	Has a drier with half-load/economy programme: Yes, but they do not use it	-1
	2	Has a drier with half-load/economy programme: Yes, and they use it	1
	3	Has a drier with half-load/economy programme: NO	0
	-	The household does not have a drier	0
P53D.5	1	Has a dishwasher with half-load/economy programme: Yes, but they do not use it	-1
	2	Has a dishwasher with half-load/economy programme: Yes, and they use it	1
	3	Has a dishwasher with half-load/economy programme: NO	0
	-	The household does not have a dish washer	0
P57	1	Sets the washing machine at an appropriate temperature: hot (over 40 degrees)	-1
	2	Sets the washing machine at an appropriate temperature: warm (from 30 to 40 degrees)	-0.5
	3	Sets the washing machine at an appropriate temperature: cold (under 30 degrees)	1
	4	Sets the washing machine at an appropriate temperature: varied, depending on the clothes, etc.	0.5
	-	The household does not have a washing machine	0
P60	1	Uses the “stand-by" option when switching off electrical appliances: YES	-1
	6	Uses the “stand-by" option when switching off electrical appliances: NO	1
	-	The household does not have electrical appliances	0
DISPOSAL OF REGULAR WASTE			
P49A.1	1	Only separates organic waste: YES	1
	6	Only separates organic waste: NO	-1
P49B.1	1	Separates paper and cardboard: YES	1
	6	Separates paper and cardboard: NO	-1
P49C.1	1	Separates glass: YES	1
	6	Separates glass: NO	-1
P49D.1	1	Separates packaging/plastics: YES	1
	6	Separates packaging/plastics: NO	-1
DISPOSAL OF SPORADIC WASTE			
P51.1	1	Disposes of vehicle tyres: normal rubbish	-1
	2	Disposes of vehicle tyres: recycling centre	1
	3	Disposes of vehicle tyres: company/shop that sells them	1
	8	Disposes of vehicle tyres: Not applicable	0
P51.2	1	Disposes of motor oil: normal rubbish	-1
	2	Disposes of motor oil: recycling centre	1
	3	Disposes of motor oil: company/shop that sells them	1
	4	Disposes of motor oil: tipped down sink/drain	-1
	8	Disposes of motor oil: Not applicable	0
P51.3	1	Disposes of vehicle batteries: normal rubbish	-1
	2	Disposes of vehicle batteries: recycling centre	1
	3	Disposes of vehicle batteries: company/shop that sells them	1
	8	Disposes of vehicle batteries: Not applicable	0
P52.1	1	Disposes of chemical products: normal rubbish	-1
	2	Disposes of chemical products: green dot/recycling centre	1
	3	Disposes of chemical products: company/shop that sells them	1
	6	Disposes of chemical products: tipped down sink/drain	-1
	8	Disposes of chemical products: Not applicable	0
P52.2	1	Disposes of medicines: usual waste disposal	-1
	2	Disposes of medicines: green dot/recycling centre	1
	3	Disposes of medicines: company/shop that sells them	1
	6	Disposes of medicines: tipped down sink/drain	-1
	8	Disposes of medicines: Not applicable	0
P52.3	1	Disposes of small batteries: usual waste disposal	-1
	2	Disposes of small batteries: green dot/recycling centre	1
	3	Disposes of small batteries: company/shop that sells them	1
	5	Disposes of small batteries: specific container	1
	8	Disposes of small batteries: Not applicable	0
P52.4	1	Disposes of mobile telephones: usual waste disposal	-1
	2	Disposes of mobile telephones: green dot/recycling centre	1
	3	Disposes of mobile telephones: company/shop that sells them	1
	5	Disposes of mobile telephones: specific container	1
	8	Disposes of mobile telephones: Not applicable	0
P52.5	1	Disposes of household appliances: usual waste disposal	-1
	2	Disposes of household appliances: green dot/recycling centre	1
	3	Disposes of household appliances: company/shop that sells them	1
	4	Disposes of household appliances: special collection service	1

	8	Disposes of household appliances: Not applicable	0
P52.6	1	Disposes of furniture/other fixtures: usual waste disposal	-1
	2	Disposes of furniture/other fixtures: green dot/recycling centre	1
	3	Disposes of furniture/other fixtures: company/shop that sells them	1
	4	Disposes of furniture/other fixtures: special collection service	1
	8	Disposes of furniture/other fixtures: Not applicable	0
P52.7	1	Disposes of rubble/building waste: usual waste disposal	-1
	2	Disposes of rubble/building waste: green dot/recycling centre	1
	3	Disposes of rubble/building waste: company/shop that sells them	1
	4	Disposes of rubble/building waste: special collection service	1
	5	Disposes of rubble/building waste: specific container	1
	8	Disposes of rubble/building waste: Not applicable	0
P52.8	1	Disposes of cooking oil: usual waste disposal	-1
	2	Disposes of cooking oil: green dot/recycling centre	1
	4	Disposes of cooking oil: special collection service	1
	6	Disposes of cooking oil: tipped down sink/drain	-1
	8	Disposes of cooking oil: Not applicable	0
P52.9	1	Disposes of fluorescent tubes. usual waste disposal	-1
	2	Disposes of fluorescent tubes. green dot/recycling centre	1
	3	Disposes of fluorescent tubes. company/shop that sells them	1
	8	Disposes of fluorescent tubes. Not applicable	0
P52.10	1	Disposes of textiles and footwear: usual waste disposal	-1
	2	Disposes of textiles and footwear: green dot/recycling centre	1
	4	Disposes of textiles and footwear: special collection service	1
	5	Disposes of textiles and footwear: specific container	1
	8	Disposes of textiles and footwear: Not applicable	0
CONSUMPTION GUIDELINES			
P73.1	1	Disposable products: never uses them	1
	2	Disposable products: sometimes uses them	0.5
	3	Disposable products: frequently uses them	-0.5
	4	Disposable products: uses whenever possible	-1
	9	Disposable products: Doesn't know / no answer	0
P73.2	1	Recycled paper never uses them	-1
	2	Recycled paper sometimes uses them	-0.5
	3	Recycled paper frequently uses them	0.5
	4	Disposable recycled paper: uses whenever possible	1
	9	Disposable recycled paper: Doesn't know / no answer	0
P73.3	1	Returnable packaging never uses them	-1
	2	Returnable packaging sometimes uses them	-0.5
	3	Returnable packaging frequently uses them	0.5
	4	Returnable packaging uses whenever possible	1
	9	Returnable packaging Doesn't know/No answer	0
P73.4	1	Uses rechargeable batteries: never uses them	-1
	2	Uses rechargeable batteries: sometimes uses them	-0.5
	3	Uses rechargeable batteries: frequently uses them	0.5
	4	Uses rechargeable batteries: uses whenever possible	1
	9	Uses rechargeable batteries: Doesn’t know / no answer	0
P74.3	1	Energy efficiency/consumption: not at all important	-1
	2	Energy efficiency/consumption: not very important	-0.5
	3	Energy efficiency/consumption: quite important	0.5
	4	Energy efficiency/consumption: very important	1
P74.4	1	Ecological guarantee/label: not at all important	-1
	2	Ecological guarantee/label: not very important	-0.5
	3	Ecological guarantee/label: quite important	0.5
	4	Ecological guarantee/label: very important	1
P74.5	1	Local product/production proximity: not at all important	-1
	2	Local product/production proximity: not very important	-0.5
	3	Local product/production proximity: quite important	0.5
	4	Local product/production proximity: very important	1
TRANSPORT AND MOBILITY			
P67.1 / 4-6	0	People who use public transport, cycles, walks or does not travel / persons in the household (%)=0	0
	<0.25	People who use public transport, cycles, walks or does not travel / persons in the household (%)=0.01-0.24	0.25
	<0.50	People who use public transport, cycles, walks or does not travel / persons in the household (%)=0.25-0.49	0.5
	<0.75	People who use public transport, cycles, walks or does not travel / persons in the household (%)=0.50-0.74	0.75
	1	People who use public transport, cycles, walks or does not travel / persons in the household (%)=0.75-1	1

P67.2 / 3	0	People who use private transport/people in the household (%)-0	0
	<0.25	People who use private transport/people in the household (%)=0.01-0.24	-0.25
	<0.50	People who use private transport/people in the household (%)=0.25-0.49	-0.5
	<0.75	People who use private transport/people in the household (%)=0.50-0.74	-0.75
	1	People who use private transport/people in the household (%).0-75.1	-1

P70A.1	1	Type of vehicle 1=Small car	-0.5
	2	Type of vehicle 1=Medium car	-0.5
	3	Type of vehicle 1=Large car	-1
	4	Type of vehicle 1=Van	-1
	5	Type of vehicle 1=4x4	-1
	6	Type of vehicle 1=Van	-1
	7	Type of vehicle 1=Van	-0.5
	8	Type of vehicle 1=Motorbike up to 125 cc	-0.5
	9	Type of vehicle 1=Motorbike over 125 cc	-1
	-	The household does not have a vehicle	1
P70A.2	1	Vehicle air conditioning 1=YES	-1
	6	Vehicle air conditioning 1=NO	1
	-	The household does not have a vehicle	0
P70A.3	1	Vehicle 1= Unleaded 95 Petrol	0
	2	Vehicle 1 =Unleaded 95 Petrol	0
	3	Vehicle fuel 1 =diesel	-1
	4	Vehicle fuel 1 =ULSD diesel	-1
	5	Vehicle 1=Biofuel	1
	6	Vehicle 1=Others	0
	-	The household does not have a vehicle	0
P76	1	Usual means of transport: car	-1
	2	Usual means of transport: motorbike/moped	-1
	3	Usual means of transport: taxi	-1
	4	Usual means of transport: bus	0
	5	Usual means of transport: underground/tram	0
	6	Usual means of transport: train (RENFE, Euskotren, other trains)	0
	7	Usual means of transport: other collective means (specify)	0
	8	Usual means of transport: bicycle	1
	9,0	Usual means of transport: on foot or does not travel	1
P82	1	Walks for distances under 2 kilometres: YES	1
	6	Walks for distances under 2 kilometres: NO	-1
ENVIRONMENTAL ATTITUDE			
P83	1	Concerned about the environment: Not at all	-1
	2	Concerned about the environment: A little	-0.5
	3	Concerned about the environment: A great deal	1
P86.1	1	Works with an organisation to defend the environment : YES	1
	6	Works with an organisation to defend the environment : NO	0
P86.2	1	Takes part in environmental volunteer actions: YES	1
	6	Takes part in environmental volunteer actions: NO	0
P86.3	1	Signs petitions against environmentally-hazardous situations:. YES	1
	6	Signs petitions against environmentally-hazardous situations:. NO	0
P86.4	1	Demonstrates against any environmentally hazardous situation: YES	1
	6	Demonstrates against any environmentally hazardous situation: NO	0
P86.5	1	Personally denounces environmental problems: YES	1
	6	Personally denounces environmental problems: NO	0
P88.1	1	Is in favour of fining people to ensure waste separation: YES	1
	6	Is in favour of fining people to ensure waste separation: NO	0
P88.2	1	Is in favour of restricting abusive water consumption: YES	1
	6	Is in favour of restricting abusive water consumption: NO	0
P88.3	1	Is in favour of establishing a tax on the most polluting fuels: YES	1
	6	Is in favour of establishing a tax on the most polluting fuels: NO	0
P88.4	1	Is in favour of restricting the use of private transport: YES	1
	6	Is in favour of restricting the use of private transport: NO	0
P88.5	1	Is in favour of establishing an ecological tax on tourism: YES	1
	6	Is in favour of establishing an ecological tax on tourism: NO	0
P88.6	1	Is in favour of installing a renewable energy park: YES	1
	6	Is in favour of installing a renewable energy park: NO	0
P88.7	1	Is in favour of paying more for using alternative energies: YES	1
	6	Is in favour of paying more for using alternative energies: NO	0

Given the mainstreaming of all the simple indicators in values ranging between -1 and 1, when there is penalisation, and between 0 and 1 for indicators without penalisation, it can be seen that the minimum possible aggregated score for a household is 47 point and maximum is 75 points.

In order to have aggregated score that can be more immediately and intuitively interpreted, the variables have been transformed *a posteriori* con the "5x+5" linear function, so that the range of values is between 0 and 10 points.

CONSTRUCTING SYNTHETIC INDICATORS

Once the structure of the Environmental Indicator had been defined and the data transformation and mainstreaming criterion adopted, the simple indicators were then aggregated into composite or synthetic indicators associated to the dimensions. Likewise the composite or synthetic indicators of the seven dimensions were aggregated to form the global synthetic indicator. The aggregation was performed by using a **weighting** vector in each of the two aggregation phases (simple indicator to dimension and from dimension to global indicator).

Each team of independent experts consulted by the statistics offices of the Environmental Survey Working Group[3], once the structure of the indicator had been defined, proposed one or several weighting vectors (the INE, as it represents numerous Autonomous Communities, contributed the largest number of weighting vectors). The independent experts always took into account the results arising from the previously performed multivariate analysis. The compromise reached by the Working Group was to use the arithmetical average that allows:

1. the Autonomous Communities overall to be represented as best as possible, including the specific features and the aspects common to all of them,
2. a comparison filled with the results obtained by Autonomous Communities.

The finally obtained weighting vector is broken down as follows.

Dimension	*Indicator*		
0.1638	**1,0000**	**WATER SAVING**	
	0.0825	P18.1	Uses a lever mixer or thermostatic tap
	0.1252	P18.2	Uses water saving appliances
	0.1252	P18.3	Uses flow restrictors
	0.1175	P19.1	Recycles water
	0.0821	P19.4	Fills the sink before washing dishes
	0.1045	P19.5	Fills the dishwasher and washing machine before using them
	0.1001	P19.6	Closes the water stopcock to reduce the flow
	0.1390	P75.1	Closes the tap when washing teeth or lathering with soap
	0.1239	P75.2	Showers instead of baths
0.1901	**1**	**ENERGY SAVING**	
	0.0452	P22	Has solar energy in the house
	0.0588	P32	Turns the heating off at night
	0.0675	P34	Daytime temperature degrees with heating on
	0.0282	P40	Daytime temperature degrees with air-conditioning on
	0.0355	P41	Turns off the air-conditioning at night.
	0.0262	P43A.1	House has windows with canopies
	0.0193	P43B.1	House has windows with blinds and shutters

[3] Except for the Andalusian Statistics Office, whose contribution to the working group focused on developing the theoretical methodological development.

	0.0160	P43C.1	Has windows with tinted glass or sun protectors
	0.0507	P43D.1	House has double-glazed windows
	0.0507	P43E.1	House has windows with thermal bridge break
	0.0287	P44	Has fluorescent tubes or lights
	0.0377	P45	Has low-consumption light bulbs
	0.0179	P47	Number of rooms with fluorescent or low-consumption rooms
	0.0521	P53A.3	Energy rating of the fridge
	0.0495	P53B.3	Energy rating of the washing machine
	0.0448	P53C.3	Energy rating of the drier
	0.0481	P53D.3	Energy rating of the dishwasher
	0.0481	P53E.3	Energy rating of the oven
	0.0572	P53B.5	Has a washing machine with half-load/economy programme and uses it
	0.0572	P53C.5	Has a drier with half-load/economy programme and uses it
	0.0565	P53D.5	Has a dishwasher with half-load/economy programme and uses it
	0.0646	P57	Sets the washing machine at a temperature under 30 degrees
	0.0395	P60	Does not use the “stand-by" option when switching of the electrical appliances
0.1500	**1**	**DISPOSAL OF REGULAR WASTE**	
	0.2594	P49A.1	Only separates organic waste
	0.2506	P49B.1	Separates paper and cardboard
	0.2506	P49C.1	Separates glass
	0.2394	P49D.1	Separates packaging/plastics
0.1302	**0.9998**	**DISPOSAL OF SPORADIC WASTE**	
	0.0873	P51.1	Disposes of vehicle tyres
	0.1021	P51.2	Disposes of motor oil
	0.0878	P51.3	Disposes of vehicle batteries
	0.1032	P52.1	Disposes of chemical products
	0.0778	P52.2	Disposes of medicines
	0.0883	P52.3	Disposes of small batteries
	0.0632	P52.4	Disposes of mobile telephones
	0.0578	P52.5	Disposes of household appliances
	0.0411	P52.6	Disposes of furniture/other fixtures
	0.0411	P52.7	Disposes of rubble/building waste
	0.1164	P52.8	Disposes of cooking oil
	0.0926	P52.9	Disposes of fluorescent tubes
	0.0411	P52.10	Disposes of textiles and footwear
0.1046	**1,0001**	**CONSUMPTION GUIDELINES**	
	0.1414	P73.1	Uses disposable products
	0.1576	P73.2	Uses recycled paper
	0.1467	P73.3	Uses returnable packaging
	0.1638	P73.4	Uses rechargeable batteries
	0.1404	P74.3	Takes energy efficiency/consumption into account
	0.1251	P74.4	Takes ecological guarantee/label into account
	0.1251	P74.5	Takes local product/production proximity into account
0.1848	**1,0000**	**TRANSPORT AND MOBILITY**	
	0.2284	P67.1/4-6	Uses public transport, cycle or walk, or do not travel
	0.1501	P67.2/3	Travels in private transport
	0.1024	P70A.1	Type of vehicle 1

	0.0770	P70A.2	Vehicle air conditioning 1
	0.0918	P70A.3	Vehicle 1 fuel
	0.1979	P76	Using travels by public transport, on foot or by bike
	0.1524	P82	On foot for distances under 2 kilometres
0.0765	**1**	**ENVIRONMENTAL ATTITUDE**	
	0.0559	P83	Concerned about the environment
	0.1212	P86.1	Works with an organisation to defend the environment
	0.1304	P86.2	Takes part in environmental volunteer actions
	0.0519	P86.3	Signs petitions against environmentally-hazardous situations
	0.1014	P86.4	Demonstrates against any environmentally hazardous situation
	0.1336	P86.5	Personally denounces environmental problems
	0.0543	P88.1	Is in favour of fining people to ensure waste separation
	0.0527	P88.2	Is in favour of restricting abusive water consumption
	0.0575	P88.3	Is in favour of establishing a tax on the most polluting fuels
	0.0559	P88.4	Is in favour of restricting the use of private transport
	0.0575	P88.5	Is in favour of establishing an ecological tax on tourism
	0.0607	P88.6	Is in favour of installing a renewable energy park
	0.0670	P88.7	Is in favour of paying more for using alternative energies
1,0000	**ENVIRONMENTAL SYNTHETIC INDICATOR.**		

The **aggregation** for each was performed in two phases. In an initial phase, the values of the simple indicators (second column weightings) are lineally aggregated by obtaining a value for each synthetic or composite indicator associated to each dimension. In a second phase, the values obtained for each of the dimensions were lineally aggregated by using the weightings of each column to obtain the value of the Environmental Indicator. A score (always positive but under or equal to 10) is thus obtained for each occupied dwelling.

VALIDATION OF THE METHODOLOGY

The methodology used to prepare the Environmental Indicator was agreed by the working group, both in terms of the structure of the indicator and of the battery of simple indicators and the rules of mainstreaming, weighting and aggregation. The finally used weighting vector is, as has been described, the arithmetical average of a battery of vectors provided by different groups of independent experts. Nonetheless, and in order to perform a r**obustness and sensitivity** analysis, the Environmental Indicator was calculated for each family of the CAE using each of the weighting vectors separately. No high sensitivity indicator or a significant variability was indicated in the obtained results.